**CHAPTER 10 (Respiratory System) - Review Questions**

1. What is the balanced chemical equation for aerobic cellular respiration?

2. Distinguish between ventilation & gas exchange.

3. When air enters the lungs, name all of the structures it passes through in the correct order from the mouth/nasal passage to the site of gas exchange.

4. What is the difference between the glottis & the epiglottis?

5. The lungs provide a respiratory membrane that is internal. Name 2 types of external respiratory membranes.

6. Name the muscles involved & describe their movement during inhalation.

7. Name the muscles involved & describe their movement during exhalation.

8. How do pressure & volume affect inhalation?

9. When are the internal intercostal muscles used?

10. If you breathe in normally, then exhale normally into a spirometer, what lung volume are your measuring?

11. If you breathe in as deeply as you can, then exhale as much as you can into a spirometer, what lung volume are your measuring?

12. Describe countercurrent exchange in fish gills. Why is it beneficial?

13. What is VO2 max & how is it measured?

14. What is hemoglobin & how does carbon monoxide affect its functioning?

15. How does the tar in cigarettes affect lung function?

**CHAPTER 10 (Respiratory System) - Answers**

1. C6H12O6 + 6 O2 🡪 6 CO2 + 6H2O + ATP (energy)

2. Ventilation is the process in more complex organisms of getting oxygen-rich air to the lungs.

Gas exchange is the movement of oxygen into body cells & carbon dioxide out.

3. pharynx 🡪 larynx 🡪 trachea 🡪 bronchus 🡪 bronchioles 🡪 alveoli

4. The glottis is the opening of the trachea & the epiglottis is the muscular flap that closes the glottis during swallowing.

5. skin (in worms, frogs, etc.) and gills (in axolotl, fish, etc.)

6. The external intercostal muscles contract & move the rib cage upward & outward.

The diaphragm contracts & moves downward.

7. The external intercostal muscles relax & move the rib cage downward & inward.

The diaphragm relaxes & moves upward.

8. When you inhale, the volume of the chest cavity is increased & the pressure inside your lungs is lower. The higher pressure air outside flows in.

9. during strenuous exercise or forced exhalation

10. tidal volume

11. vital capacity

12. The water flowing through the gills flows in the opposite direction to the blood flowing through the capillaries. This allows the blood to pick up almost 100% of the oxygen in the water

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13. It is the maximum rate at which oxygen can be used by an individual; it’s measured using a spirometer while exercising on a treadmill or stationary bike.

14. Hemoglobin is a protein found in red blood cells that carries oxygen. Carbon monoxide bonds with hemoglobin & prevents oxygen from being carried in the blood.

15. tar can accumulate in the alveoli, preventing gas exchange; it also contains hundreds of chemicals, many of which are toxic and some of which are carcinogenic